

# Strategic Environmental Assessment

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## Site Specific Baseline Hunterston A

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May 2010

An Environmental and Sustainability Report will be published as part of the Strategic Environmental Assessment (SEA) of the Revised NDA Strategy. It has been produced in compliance with the SEA Directive (2001/42/EC) and transposing regulations (S.I.1633, 2004).

The following pages contain specific baseline information, and maps, for the Hunterston A site. This information is used in the preparation of the Environmental and Sustainability Report. A short introduction is followed by a table containing the current baseline information, organised by sustainability headings. The final section includes information about future developments and environmental issues.

The NDA is committed to openly sharing information and making it accessible to all. In making this non-confidential environmental and sustainability information available we believe that it will provide a useful ongoing resource to the general public.

## Site Specific Baseline for Hunterston A

### Hunterston A

Hunterston A nuclear power station is located in Ayrshire, West Scotland and covers an area of 36 hectares. It started electricity generation in 1964 and operated for 26 years until 1990. Decommissioning began in 1990 with de-fuelling which was completed in 1995. The Hunterston A site is currently undertaking care and maintenance preparations which are due to last for 12 years until 2020. A period of care and maintenance will run for between 85 and 100 years, with final site clearance lasting an additional 10 years.

### Site End State Assumption

The preferred end state for Hunterston A is for the demolition and de-licensing of the site. This will involve the removal of all hazards from the site, including the demolition of all the buildings. All waste arising will be appropriately treated, processed, packaged and sent for permanent off-site disposal. Contaminated soil, foundations and underground drains and pipes may also be removed and treated as necessary to allow the site to be de-licensed. The de-licensed site would allow unrestricted access and would be suitable for a range of uses such as agriculture, recreation, business, industrial or any other use, if in line with regional planning strategies.

### Current Environmental Baseline

**Table 3: Baseline Data across all topics for Hunterston A**

SEA Objective	Key Environmental Baseline	Source
<b>Air Quality</b>	<p>Hunterston A discharged <math>4.26 \cdot 10^{-7}</math> TBq of beta radioactivity to the atmosphere, amounting to less than 1% of the annual discharge limit. It also discharged 0.0013 TBq of tritium, amounting to 6.5% of annual discharge limits, and <math>1.28 \cdot 10^{-4}</math> TBq of carbon-14, amounting to 6.4% of the annual discharge limits. The discharges were assessed to result in doses to the critical group (a group or representative individual who receive the largest dose from artificially produced radionuclides due to their habits, diet and where they spend their time) of less than 0.024 mSv/y, or 2.4% of the public dose limit of 1 mSv/y (from all sources).</p> <p>Modest non-radioactive emissions including PM<sub>10</sub> and NO<sub>2</sub> result from vehicle and plant machinery (including the diesel site generator plant) used on site. However, they are not considered significant.</p>	<p>NDA (2005) EAPINS Project Questionnaire;</p> <p>Environment Agency et al. (2009) <i>Radioactivity in Food and the Environment</i>; Magnox North (2008) <i>Hunterston A Site EIA Baseline</i></p>
<b>Global Climate Change and Energy</b>	<p>Due to the location of Hunterston A, it is anticipated that the site will become increasingly vulnerable to flood risks as a result of expected climatic changes. In 2007, the site consumed 16.95 TJ of energy.</p>	<p>NDA (2005) EAPINS Project Questionnaire; NDA (2008) <i>Site</i></p>

	CO <sub>2</sub> emissions are not measured, but other than those arising from the consumption of energy, and occasional emissions from emergency diesel generators that operate periodically for tests, there are estimated to be few sources of emissions on site.	<i>Operator Input</i>
<b>Biodiversity, Flora and Fauna</b>	<p>The Hunterston A site is situated adjacent to a Site of Special Scientific Interest (SSSI), part of which overlaps with the NDA land-holding near the coast. The majority of the Portencross coast SSSI consists of coastal mudflats with an extension inland at the southern end which includes a habitat transition to wooded cliffs. This includes dwarf Eelgrass of national importance and the largest colony of common tern in Scotland. Scottish Natural Heritage is evaluating the interests of the Portencross coast SSSI with a view to re-notifying it in the future. A breeding bird survey undertaken in 2006 highlighted that there were a number of bird species found within the SSSI (including Lapwing which is a Red list bird species).</p> <p>A holistic approach to biodiversity should recognise that biodiversity is more than just the reflection of designated sites. It is an interrelated network of habitats and species, of which designated sites and species are those that are most fragile or rare and require the highest degree of protection. Many non designated species of flora and fauna are found in the area. Scottish Natural Heritage highlights that the Natura 2000 network of sites in Scotland is nearly complete, but that additional sites, particularly within the marine environment may be identified in the future.</p> <p>A generic assessment on the impacts of the radioactive discharges on wildlife from the UK's nuclear power stations concluded that the chronic dose rate guideline was not exceeded for any of the assessed marine or terrestrial organisms. Furthermore, the estimated doses to wildlife were below the level at which effects could be observed.</p> <p>The supporting figure highlights the context of the nuclear licensed site and its immediate surroundings. The area shown in the figure does not attempt to identify all potential designated sites that may be affected by activities associated with the UK Nuclear Industry LLW Strategy. Rather, it attempts to strike a balance between highlighting those sites that are in the vicinity of the nuclear licensed site between different topic themes. Hence, more expansive coverage would reduce the visibility of designated Scheduled Ancient Monuments which, by their nature, have significantly smaller coverage than ecological based designated areas.</p>	<p>NDA (2005) <i>EAPINS Project Questionnaire</i>; Environment Agency (2002) <i>Impact Assessment of Ionising Radiation on Wildlife</i>; Magnox North (2008) <i>Hunterston A Site EIA Baseline</i>; Craigton Ecological Services (2006) <i>Portencross Coast Site of Special Scientific Interest: Breeding bird survey of sand dunes and saltmarsh habitat</i>, Scottish Natural Heritage, Commissioned Report No.210</p>
<b>Landscape and Visual</b>	Hunterston A is situated on Ayrshire's extensive coastline which has numerous features of nature conservation interest. These are principally intertidal mudflats, sands and shingles, sand dunes and dune grasslands, sea cliffs and former cliff slopes and the transitional vegetation between these different zones. These features and broader areas influenced by salt laden winds support a broad range of seabirds and wildfowl, locally distinctive or rare plant communities and insects which contribute to the local character of the landscape.	<p>Ayrshire landscape assessment 1988</p> <p>Scottish Natural Heritage</p>
<b>Cultural Heritage</b>	Some 1 km from the site is Hunterston House, which is a Grade B listed building. Approximately 2 km to the south of the operational site is Portencross Castle, built in the 14 <sup>th</sup> Century which is grade A listed.	<p>NDA (2005) <i>EAPINS Project Questionnaire</i>; Magnox North (2008) <i>Hunterston A Site EIA Baseline</i></p>
<b>Groundwater, Geology and Soils</b>	In terms of radioactive contamination, a number of areas on site had raised surface activity concentrations. According to the Integrated Waste Strategy, it is estimated that there will be 1,636 m <sup>3</sup> of land contaminated with radioactive material which will require treatment as LLW during care and maintenance preparations, with an additional 3,800 m <sup>3</sup> generated during final site clearance. There is only minor hydrocarbon contamination on site with some traces found in groundwater. The Scottish Soil Framework indicates that Hunterston is located in an area of predominantly	<p>NDA (2007) <i>Hunterston A 2007/08 IWS</i>; Scottish Government (2009) <i>The</i></p>

	brown earth soils.	<i>Scottish Soil Framework</i>
<b>Surface Water Resources and Quality</b>	<p>Radiological discharges to water sources from the Hunterston A site are generally low with 0.17 GBq of alpha and 65 GBq of beta and gamma radioactive discharges recorded in 2004.</p> <p>RIFE data indicates that <math>1.35 \times 10^{-4}</math> TBq of alpha liquid discharge was released, amounting to less than 1% of the annual discharge limits. Additionally, 0.0386 TBq of beta, accounting for 6.4% of the annual discharge limit was released along with <math>6.1 \times 10^{-4}</math> TBq of tritium and <math>8.2 \times 10^{-5}</math> TBq plutonium-241, both accounting for less than 1% of annual discharge limits.</p> <p>The discharges were assessed to result in doses to the critical group (a group or representative individual who receive the largest dose from artificially produced radionuclides due to their habits, diet and where they spend their time) of less than 0.005 mSv/y, or less than 0.5% of the public dose limit (from all sources) of 1 mSv/y.</p> <p>The water quality in the Hunterston A area of the Clyde was generally classified as high (Class A) and 'excellent' under SEPA's Coastal Scheme. Further to the south, the Seamill and Ardrossan is classified as having moderate coastal water quality in accordance with the Water Framework Directive River Basin Management Plan.</p> <p>In 2004, the Hunterston A site consumed approximately 13,000 litres of water.</p>	<p>NDA (2005) EAPINS Project Questionnaire;</p> <p>Environment Agency et al. (2009) <i>Radioactivity in Food and the Environment</i>;</p> <p>Magnox North (2008) <i>Hunterston A Site EIA Baseline</i>; SEPA (2009) <a href="http://gis.sepa.org.uk/rbmp/MapViewer.aspx">[http://gis.sepa.org.uk/rbmp/MapViewer.aspx]</a></p>
<b>Waste</b>	<p>Some radioactive wastes are produced as a result of the decommissioning activities. In 2004, this amounted to approximately 390 m<sup>3</sup> of Low Level Waste (LLW) designated for consignment to the LLW repository near Drigg. In 2007, it was estimated that there will be a total of 5,825 m<sup>3</sup> of ILW will be generated during decommissioning, which will be packaged before being temporarily stored on site, prior to permanent off-site disposal.</p> <p>There are estimated to be 3,200 m<sup>3</sup> of unpackaged Intermediate Level Waste (ILW) in storage. This is currently planned to be retrieved, packaged and placed in an on-site ILW store until an off-site disposal facility is available to receive such wastes. The ILW interim storage facility is has been completed although remains empty at present whilst no ILW has been conditioned or packaged ready for storage.</p> <p>In addition, some 25,470 m<sup>3</sup> of LLW is likely to be generated, the majority arising during final site clearance and will be packaged before disposal.</p>	<p>NDA (2005) EAPINS Project Questionnaire; NDA (2007) <i>Hunterston A 2007/08 IWS</i></p>
<b>Economy, Society and Skills</b>	<p>The Largs South &amp; Fairlie ward (in which the site is located) is predominantly rural. It consists of a population of some 4,300 of which 60% of the working population are employed. There are a large proportion of retirees; some 27.3%. Expenditure from the site contributes some £13 million to the local economy. This is expected to drop to £8.5 million per annum up to 2010 and will further decrease after 2020. In 1999, Hunterston A site supported approximately 180 employees and 60 contractors. All employees will leave the site by the end of care and maintenance preparations. According to the Hunterston A Site EIA Baseline, North Ayrshire has the 3<sup>rd</sup> highest rate of unemployment of the 32 unitary authorities in Scotland.</p> <p>Approximately 2.20% of the ward's, and 2.54% of the county's working population remain in education as full-time students. Some 29.5% of the working population of Largs South &amp; Fairlie ward and 14.6% of the North Ayrshire district have qualifications equivalent to NVQ level 4 / 5 (e.g. degree). Whilst the local ward statistic is relatively high the county qualification figure is slightly below the national equivalent of 20%.</p>	<p>(General Register Office for Scotland)2001 Census</p> <p>NDA (2005) EAPINS Project Questionnaire</p> <p>Magnox North (2008) <i>Hunterston A Site EIA Baseline</i></p>

<b>Traffic and Transport</b>	<p>The Hunterston A site is located approximately 2 km to the west of the A78 which provides links with the wider strategic road network. In 2006, Annual Average Daily Traffic (AADT) flow counts showed that a total of 7,644 vehicles travel on the A78, of which nearly 7% are HGVs.</p>	<p>Department for Transport website (<a href="http://www.dft.gov.uk">www.dft.gov.uk</a>)</p>
<b>Land Use and Material Assets</b>	<p>The site contains a number of structures related to the nuclear power station including Hunterston B nuclear reactor. The land surrounding the operational site is predominantly agricultural and grass lowland. The nearest notable settlement is West Kilbride, located approximately 3.5 km to the southeast. Hunterston A covers some 36 ha. It is recognised that the Land Reform (Scotland) Act (2003) gives everyone statutory access rights to most land and inland water providing they exercise such rights responsibly.</p> <p>In 2004, the Hunterston A site consumed approximately 13,000 litres of water.</p>	<p>Magic website (<a href="http://www.magic.gov.uk">www.magic.gov.uk</a>); NDA (2005) EAPINS Project Questionnaire</p>
<b>Noise and Vibration</b>	<p>Noise and vibration levels from the site are considered to be minimal and no complaints of it causing nuisance to local receptors have been recorded. It is considered that post-2020, when care and maintenance begins the levels of noise and vibrations will reduce even further as a result of lower activity levels on site.</p>	<p>NDA (2005) EAPINS Project Questionnaire</p>
<b>Health and Safety</b>	<p>The discharges to the aquatic environment were assessed to result in doses to the critical group (a group or representative individual who receive the largest dose from artificially produced radionuclides due to their habits, diet and where they spend their time) of less than 0.005 mSv/y, which is less than 0.5% of the dose limit for members of the public (from all sources) of 1 mSv/y. The radiation dose to the critical group due to discharges to the atmosphere, including a contribution due to weapon testing and Chernobyl fallout, was estimated to be 0.006 mSv/y which is 0.6% of the dose limit for members of the public (from all sources) of 1 mSv/y, or approximately 0.3% of the annual average UK public background radiation exposure.</p> <p>The maximum radiological dose to workers in 2007 was 2.038 mSv/y. The mean worker dose was estimated as 0.071 mSv/y.</p> <p>In 2007, Hunterston A recorded an Operational Safety and Health Administration (OSHA) Total Recordable Incident Rate (TRIR) of 0.31. In 2007 there was 1 recorded RIDDOR incident.</p>	<p>Environment Agency et al. (2009) <i>Radioactivity in Food and the Environment</i>;</p> <p>NDA (2005) EAPINS Project Questionnaire; NDA (2008) <i>Annual HSSE Report</i></p>

## Future Developments

There is likely to be a noticeable effect on the local economy as the number of employees at Hunterston A decrease until 2020 and remain minimal to 2080, along with the resulting decrease in money entering the local economy. This is also likely to also affect the number of jobs indirectly supported by activities at the site.

Facilities for the management and interim storage of ILW have been constructed on-site although currently remain empty, with no ILW having been conditioned or packaged as yet. Volumes of LLW and ILW generated are anticipated to be minimal during care and maintenance but will increase significantly during final site clearance.

Discharges have declined significantly now the site is no longer operational and are expected to continue to decline during the care and maintenance preparations. However, certain decommissioning activities may result in short term increases in discharges for example as legacy wastes are retrieved and processed to make them passively safe.

It is anticipated that there will be negligible discharges from the site during the decommissioning care and maintenance period. Higher discharges, especially those to air, may be anticipated to occur during final site

clearance when the reactors are dismantled, however, these discharges have not been estimated in detail at this time.

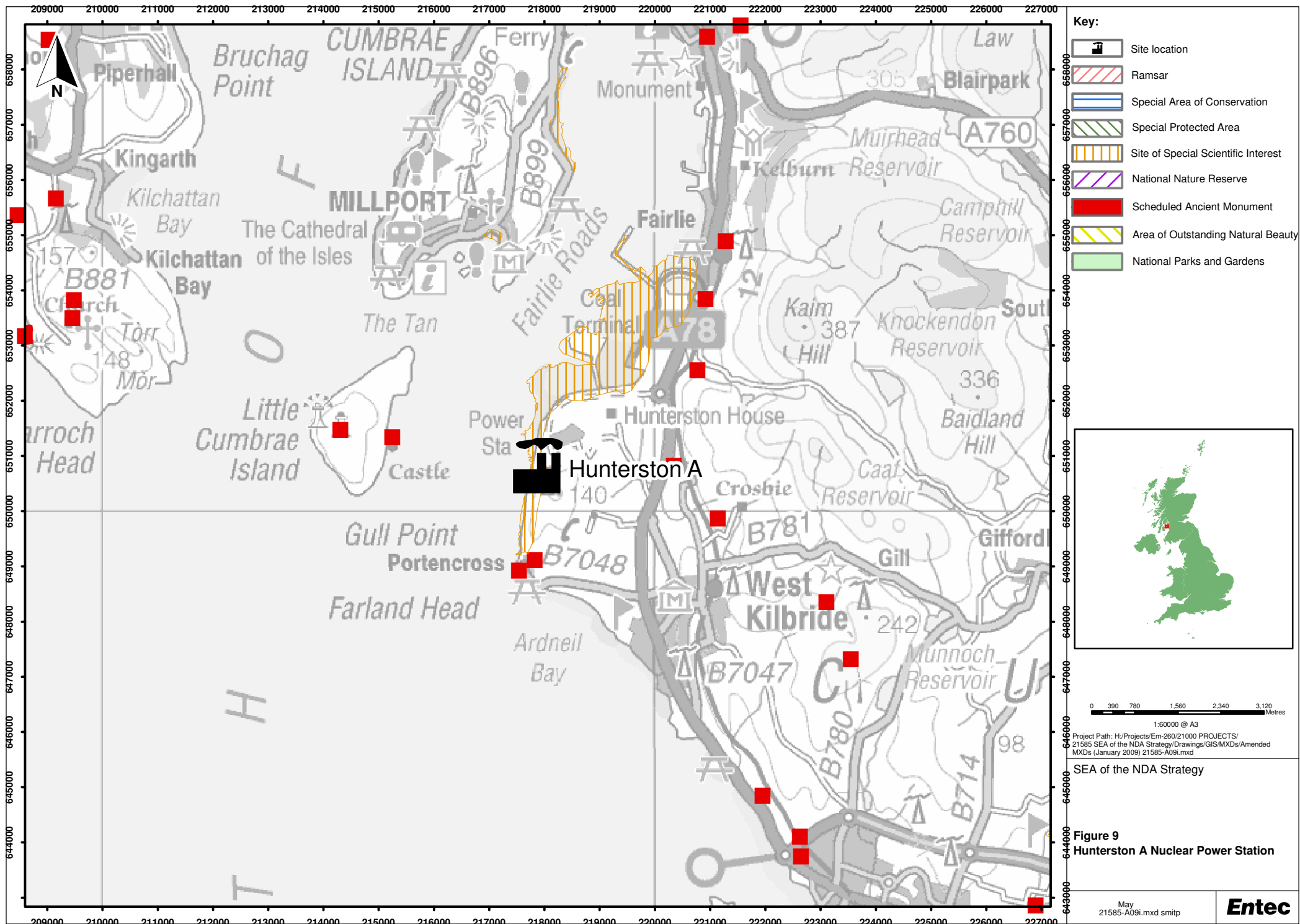
Changes in the levels of activities on the site may have an affect on the SSSI designated area situated in the vicinity of the operational site such as an increase in noise during demolition activities may affect the bird population.

## Environmental Issues

The site is potentially going to be increasingly vulnerable to flood risks as a result of the anticipated effects of climate change, including rising sea-levels and more frequent storms, although it poses less of a risk to the site over the timescale of interest than coastal erosion which is recognised as an issue for the historic LLW disposal facility.

Soil and groundwater quality at Hunterston A is of potential concern due to radioactive and non-radioactive contamination, as described above.

There will be a significant decrease in the number of jobs supported by the site during the decommissioning care and maintenance period.



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